

THE INVENTOR CLAIMS:

1. An accommodating intraocular lens to be implanted in a
2 human eye within a natural capsular bag in the eye attached about
its perimeter to the ciliary muscle of the eye and having a
4 certain inner diameter when the ciliary muscle is in its relaxed
state, the bag including an elastic posterior capsule which is
6 urged anteriorly by vitreous pressure in the eye and an anterior
capsule opening bounded by an anterior capsular remnant that fuses
8 to the posterior capsule by fibrosis during a postoperative
fibrosis period in which said bag and remnant shrink, and said
10 remnant being tautly stretched by relaxation of the ciliary muscle
and relaxed by contraction of the ciliary muscle after fibrosis is
12 complete, said intraocular lens comprising:

14 a lens body having normally anterior and posterior sides and
including an optic and haptics having inner ends joined to
diametrically opposite sides of said optic and opposite outer
16 ends, and said haptics being movable anteriorly and posteriorly
relative to said optic and through a certain position wherein said
18 lens has a length approximating said inner diameter of said
capsular bag, and wherein

20 said lens is adapted to be implanted in said bag while said
ciliary muscle is in its relaxed state and in an implanted
22 position wherein (a) said haptics are in said certain position
relative to said optic and situated between said remnant and said
24 posterior capsule, whereby fibrosis will occur about the haptics,

(b) said optic is aligned with said anterior capsule opening, and
26 (c) shrinking of said bag and remnant during fibrosis will exert
endwise compression and posterior forces on the lens and haptics,
28 respectively, and

30 said optic is deflected posteriorly relative to the outer ends of
said haptics with resultant anterior deflection of said haptics
relative to said optic by endwise compression and posterior forces
32 applied to said lens and haptics, respectively, when said haptics
are in said certain position relative to the optic, whereby when
34 said lens is implanted in said bag, relaxation of the ciliary
muscle after completion of fibrosis effects posterior deflection
36 of the implanted lens against the posterior capsule of the bag by
the taut remnant, and contraction of the ciliary muscle effects
38 anterior accommodation of the implanted lens by the posterior
capsule, vitreous pressure, and endwise compression of the lens.

2. An accommodating intraocular lens comprising:

2 a lens body having normally anterior and posterior sides and
including an optic, haptics extending from diametrically opposite
4 sides of said optic and having inner ends adjacent said optic and
opposite outer ends, and hinge means pivotally joining said inner
6 haptic ends to said optic for pivotal movement of said haptics
about said hinge means anteriorly and posteriorly relative to said
8 optic.

3. An accommodating intraocular lens according to Claim
2, wherein:

4 said hinge means comprise flexible hinge portions of said lens
body.

2 4. An accommodating intraocular lens according to Claim
3, wherein:

2 said hinge portions comprise flexible reduced portions of said
4 lens body.

5. An accommodating intraocular lens to be implanted in a
2 human eye within a capsular bag in the eye having a posterior
capsule, and an anterior capsular remnant bounded by an anterior
4 capsular remnant, said lens comprising:
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6 a lens body having normally anterior and posterior sides and
including an optic and haptics having inner ends joined to
8 diametrically opposite sides of said optic and opposite outer
ends, and said haptics being movable anteriorly and posteriorly
relative to said optic, and

10 fixation means on said haptics for at least one of the following
purposes: (a) positioning the lens in the capsular bag, (b)
12 effecting fixation of the outer haptic ends in the bag by
fibrosis.

6. An accommodating intraocular lens according to Claim
2 5, wherein:

4 said fixation means comprise loops at the outer ends of the
haptics about which fibrosis can occur.

7. An accommodating intraocular lens according to Claim
2 5, wherein:

4 said fixation means comprise springs at the outer ends of said
haptics having normal unstressed positions wherein said springs
extend beyond their adjacent outer haptic ends in the endwise
directions of the haptics for resilient engagement with the
perimeter of said bag to firmly position the lens in the bag
during fibrosis and prevent dislocation of the lens in the bag if
said capsular remnant is torn, slit, or otherwise ruptured during
surgery or fibrosis.

5 8. An accommodating intraocular lens comprising:

2 a lens body having normally anterior and posterior sides and
including an optic, and haptics having inner ends joined to
4 diametrically opposite sides of the optic and opposite outer ends,
and

6 grooves at one of said body sides extending across said inner
haptic ends transverse to the length of the lens and forming
8 hinges about which said haptics are flexible anteriorly and
posteriorly relative to said optic.

9. An accommodating lens according to Claim 8, wherein:

2 said grooves are located at said anterior side of the body.

10. An intraocular lens to be supported in the capsular

2 bag of the eye of the user in which a capsulorhexis procedure has
been performed, said intraocular lens having a posterior surface
4 configured to engage the posterior wall of the capsular bag when
the lens is in place, and said intraocular lens including a
6 central optical region and two opposing plate-like flexible haptic
members attached to said optical region and extending radially
8 outwardly therefrom, said haptic members being configured and
dimensioned to engage the remaining fibrosed circular anterior
10 capsular rim and the posterior capsule to form pockets therein, so
that after implantation the intraocular lens is displaced
12 posteriorly by the fibrosed rim to force the intraocular lens
against the posterior wall of the capsular bag and to stretch the
14 wall in the posterior direction, whereby contraction of the
ciliary muscle of the eye during accommodation relaxes the rim and
16 allows the stretched elastic posteriorly displaced posterior wall
of the capsular bag to contract and the haptic members to flex and
18 thus move the intraocular lens in the anterior direction.

11. The intraocular lens defined in Claim 10, and which
2 includes a spring loop mounted on each of said haptic members in
position to be lodged in the sulcus to pull the intraocular lens
4 anteriorly during accommodation.

12. The intraocular lens defined in Claim 10, in which the
2 posterior surface of the optical region is convex to be pressed
against the posterior wall of the capsule with the intraocular
4 lens implanted in the eye of the user.

13. An accommodating intraocular lens comprising:

a lens body having normally anterior and posterior sides and
including a round optic, and plate haptics having inner ends
joined to diametrically opposite edge portions of said optic at
junctions between said optic and said haptics and opposite outer
ends, and wherein

the width of said junctions measured transverse to the length of
8 said lens is substantially less than the diameter of said optic,
whereby said optic has free edge portions of substantial
10 circumferential length between said junctions,

the circumferential length of each free edge portion substantially
12 exceeds the width of each junction, and

14 said haptics are movable anteriorly and posteriorly relative to
said optic.

14. An accommodating intraocular lens according to Claim
2 13, wherein:

4 said haptics have outer end portions which are relatively wide
compared to the width of said junctions and contain openings
adjacent the outer ends of the haptics.

15. An accommodating intraocular lens according to Claim
2 13, wherein:

4 said junctions are hinge junctions about which said haptics are
movable anteriorly and posteriorly relative to said optic,

6 said haptics have outer end portions which are relatively wide
compared to the width of said junctions and contain openings in
the form of cutouts having open sides which open through the outer
ends of the haptics,

8 said lens includes spring arms at the outer ends of said haptics
10 which are fixed at one end to the outer ends of the haptics at one
side of said cutouts and extend laterally of the haptics across
12 the open sides of said cutouts in spaced relation to the adjacent
haptic ends, and

14 said spring arms are resiliently flexible toward and away from the
adjacent haptic ends.

16. An accommodating intraocular lens according to Claim
2 13, wherein:

4 said junctions are hinge junctions about which said haptics are
movable anteriorly and posteriorly relative to said optic,

6 said haptics have outer end portions which are relatively wide
compared to the width of said junctions and contain openings
8 adjacent the outer ends of the haptics, and relatively slender
bridge portions extending across the outer ends of the haptics
along the adjacent sides of said haptic openings,

10 said lens includes spring arms at the outer ends of said haptics,
which are fixed at one end to the outer ends of the haptics
12 adjacent one longitudinal edge of the haptics and extend laterally
of the haptics toward their opposite longitudinal edges in spaced
14 relation to said bridge portions endwise of the haptics, and

16 said spring arms are resiliently flexible toward and away from
said bridge portions endwise of the lens.

17. An accommodating intraocular lens according to Claim
2 14, wherein:

said haptics have inner end portions, and

4 said junctions are hinge junctions about which said haptics are
pivotally movable anteriorly and posteriorly relative to said
6 optic and which constitute virtually the entire length of said
inner end portions.

18. An accommodating intraocular lens according to Claim
14, wherein:

said optic and haptics have normally anterior and posterior
surfaces,

6 said junctions are flexible hinge junctions comprising flexible
hinge portions joining said optic edge portions and said inner
haptic ends, and

8 said optic is offset anteriorly relative to said haptics in such a
way that said anterior optic surface projects forwardly of said
10 anterior haptic surfaces, and said both said haptic edge portions
and said flexible hinge portions are situated forwardly of said
12 anterior haptic surfaces.

19. A method of implanting an intraocular lens within a
2 capsular bag of a patient's eye, said bag being attached about its
perimeter to the ciliary muscle of the eye and including an
4 elastic posterior capsule urged anteriorly by vitreous pressure in
the eye, and an anterior capsular opening bounded by a capsular
6 remnant which fuses to the posterior capsule by fibrosis during a
postoperative fibrosis period, and wherein said ciliary muscle has
8 a distant vision relaxed state and a near vision contracted state,
and said vitreous pressure is reduced and said bag and remnant are
10 stretched by relaxation of said muscle, and said vitreous pressure
is increased and said bag and remnant are relaxed by contraction
of said muscle, said method comprising the steps of:

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selecting an intraocular lens having normally anterior and
posterior sides and including a central optic, and haptics having
inner ends joined to said optic and opposite outer ends movable
anteriorly and posteriorly relative to said optic,

implanting the selected intraocular lens within said capsular bag
18 in a manner such that said haptics are situated between said
capsular remnant and the outer perimeter of said posterior
20 capsule, said optic is aligned with said anterior capsular
opening, and

22 permitting fibrosis to occur about said haptics while said ciliary
muscle is in its relaxed state in such a way as to form haptic
24 pockets in the fibroose tissue and urge said optic posteriorly
against said posterior capsule, whereby relaxation of the ciliary

26 muscle after fibrosis is complete cause posterior movement of said
optic against said posterior capsule by said capsular remnant, and
28 contraction of the ciliary muscle causes anterior accommodation
movement of the optic by said posterior capsule, vitreous
30 pressure, and endwise compression of the lens.

20. The method of Claim 19 including the additional step
of:

paralyzing the ciliary muscle in its relaxed state with a
cycloplegic when implanting the lens in said bag and maintaining
the muscle in said relaxed state with a cycloplegic until fibrosis
is complete to effect proper formation of said haptic pockets and
prevent dislocation of the lens by contraction of the ciliary
muscle during fibrosis.

21. The method of Claim 20, wherein:

2 said capsular bag and remnant shrink during fibrosis in a manner
which causes endwise compression of the lens and posterior
4 movement of said optic to a distant vision position wherein said
optic presses rearwardly against said posterior capsule and
6 stretches the posterior capsule rearwardly to produce an anterior
elastic bias force on the lens,

8 relaxation of the ciliary muscle after fibrosis is complete
reduces said vitreous pressure and stretches said capsular remnant
10 to effect posterior movement of said optic to said distant vision
position by the capsular remnant, and

12 contraction of the ciliary muscle after fibrosis is complete
compresses the lens endwise to cause anterior accommodation
14 movement of said optic by said bias force, vitreous pressure, and
anterior buckling of the lens.

22. A method according to Claim 19, wherein:

2 said haptics are plate haptics, and

4 said lens includes fixation elements at the outer ends of and
permanently fixate said elements in said bag, and

6 said haptics are separable from said fixation elements, whereby
said fixation elements position said lens in said bag, and said
lens is separable from said fixation elements to permit removal of
said lens from and replacement of the lens in said bag.

23. A method according to Claim 19, wherein:

2 said anterior capsule opening is a generally circular opening
formed by anterior capsulorhexis of the natural lens of the eye,
4 and said capsular remnant is an annular capsular rim
circumferentially surrounding said anterior capsule opening.

24. A method of implanting an intraocular lens within a
2 patient's eye having a natural lens containing a natural lens
matrix and including an elastic posterior capsule urged anteriorly
4 by vitreous pressure in the eye, and an anterior capsule, said
method comprising the steps of:

6 performing a capsulotomy on said anterior capsule to form an
opening in said anterior capsule bounded by a remnant of the
8 anterior capsule, and removing the natural lens matrix from the
natural lens through said anterior capsule opening to provide a
10 capsular bag attached about its perimeter to the ciliary muscle of
the eye and including said elastic posterior capsule and said
12 anterior capsule remnant

selecting an intraocular lens having normally anterior and
14 posterior sides, a central optic, and haptics having inner ends
joined to said optic and opposite outer ends movable anteriorly
16 and posteriorly relative to said optic,

implanting the intraocular lens within said capsular bag while
said ciliary muscle is in its relaxed state and in a position
wherein said haptics are situated between said remnant and said
20 posterior capsule, and said optic is aligned with said anterior
capsule opening, and

22 allowing fusion of said remnant to said posterior capsule by
fibrosis while said ciliary muscle is in its relaxed state,
24 whereby (a) fibrosis occurs about said haptics to form haptic
pockets in the fibrose tissue, (b) said optic is urged posteriorly
26 against said posterior capsule by shrinking of said bag and
remnant during fibrosis, (c) relaxation of the ciliary muscle
28 after fibrosis is complete causes posterior movement of said optic
against said posterior capsule by said remnant, and contraction of
30 the ciliary muscle causes anterior accommodation movement of the
optic by said posterior capsule, vitreous pressure, and endwise
32 compression of the intraocular lens.

25. A method according to Claim 24 including the
2 additional step of:

paralyzing the ciliary muscle in its relaxed state with a
4 cycloplegic when implanting the intraocular lens in said bag and
6 maintaining the muscle in said relaxed state with a cycloplegic
8 until fibrosis is complete to effect proper formation of said
haptic pockets and prevent dislocation of the intraocular lens by
contraction of the ciliary muscle during fibrosis.

26. The method of Claim 25, wherein:

4 said bag and remnant shrink during fibrosis in a manner which -
causes endwise compression of the intraocular lens and posterior
movement of said optic to a distant vision position wherein said
optic presses rearwardly against said posterior capsule and
stretches the posterior capsule rearwardly to produce an anterior
elastic bias force on the intraocular lens.

27. A method according to Claim 19, wherein:

2 the optic of said intraocular lens is larger than said anterior
capsule opening, and
4 said method includes the additional step of cutting said capsular
remnant about said opening after completion of fibrosis in such a
6 way as to permit free movement of said optic into and from the
opening during accommodation.

28. An accommodating intraocular lens implant within a
2 human eye having a natural capsular bag attached about its
perimeter to the ciliary muscle of the eye and from which the
4 natural lens matrix has been removed, the bag including an elastic
posterior capsule urged anteriorly by vitreous pressure and an
6 anterior capsule opening circumferentially surrounded by a
capsular remnant fused by fibrose tissue to the posterior capsule,
8 said lens implant comprising:

10 an intraocular lens having normally anterior and posterior sides
and including a central optic, and haptics extending from opposite
edges of the optic and having inner ends joined to the optic and
12 opposite outer ends movable anteriorly and posteriorly relative to
14 said optic, and wherein
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18 said intraocular lens is situated within said capsular bag in a
position wherein said optic is aligned with said anterior opening
and the outer ends of said haptics are disposed between said
remnant and said posterior capsule and confined within pockets in
20 the fibrose tissue in a manner such that relaxation of the ciliary
muscle effects posterior deflection of the lens and constriction
of the ciliary muscle effects anterior accommodation of the lens.

29. An intraocular implant according to Claim 28, wherein:

2 relaxation of the ciliary muscle reduces vitreous pressure and
stretches said remnant to a relatively taut condition to effect
4 posterior deflection of said lens by the remnant to a distant
vision position wherein said lens presses against said posterior
6 capsule and stretches the posterior capsule rearwardly to produce
a forward elastic bias force on said lens, and contraction of the
8 ciliary muscle relaxes the capsular remnant and increases vitreous
pressure to effect anterior accommodation of the lens by said bias
10 force and vitreous pressure.

30. A lens implant according to Claim 28, wherein:

2 said lens includes fixation means at the outer ends of said
haptics which are firmly anchored in said fibrose tissue to
4 positively prevent dislocation of the lens in said capsular bag.

31. An accommodating intraocular lens to be surgically
2 implanted within a natural ocular capsular bag including an
elastic posterior capsule urged anteriorly by vitreous pressure
4 and an anterior capsule opening bounded by an anterior capsule rim
which fuses by fibrosis to the posterior capsule during a post-
6 operative healing period following surgery with the ciliary muscle
paralyzed in its relaxed state, said lens comprising:

8 a lens body having normally anterior and posterior sides, a
central optic having an optic axis, and a plurality of extended
10 portions extending generally radially out from the optic, each
extended portion having an inner end connected to the optic and an
outer end remote from said inner end movable anteriorly and
12 posteriorly relative to said inner end,

14 said lens adapted for insertion through said anterior capsule
opening to an implanted position within said bag in which said
extended portions are situated between said rim and posterior
capsule for fixation of the lens in the bag and posterior
18 deflection of the lens against said posterior capsule by fibrosis
of said rim to said posterior capsule during said healing period,
20 and said extended portions adapted for rearward deflection of said
optic upon ciliary muscle relaxation to a posterior distant vision
22 position in which the lens has a posterior distant vision
configuration and for forward deflection of said optic upon
24 ciliary muscle contraction to a near vision position, resulting in
consistent accommodation of the implanted lens with said
26 contraction and relaxation of the ciliary muscle, and wherein

the outer ends of said extended portions are located approximately
2 in a common tip plane normal to said optical axis when said lens
has said posterior rear vision configuration, and

4 the inner ends of said extended portions are located in certain
positions relative to said plane when said lens has said posterior
6 distant vision configuration, and said certain positions are
within the range of positions between and including posterior
8 positions in which the inner ends of said extended portions are
located rearwardly of said plane and anterior positions in which
10 said inner ends are located forwardly of said plane, and

12 said extended portions adapted to deflect said optic rearwardly
upon radial compression of said lens by inwardly directed forces
exerted on the outer ends of said extended portions when said
inner ends of said extended portions are located rearwardly of
16 said plane, and said extended portions adapted to deflect said
optic forwardly upon radial compression of said lens by inwardly
directed forces exerted on the outer ends of said extended
18 portions when said inner ends of said extended portions are
located forwardly of said plane.

34. An accommodating intraocular lens according to Claim
2 32, wherein:

4 said hinges are located forwardly of said plane when said lens has
said posterior distant vision configuration.

35. An accommodating intraocular lens according to Claim
2 31, wherein:

each extended portion comprises a T-shaped plate haptic including
4 a plate portion having an inner end connected to said optic, an
opposite outer end, and longitudinal edges, and flexible fixation
fingers at the outer end of said plate portion extending laterally
out from the edges of said plate portion.

36. An accommodating intraocular lens comprising:

2 a lens body having normally anterior and posterior sides and
including a central optic and extended portions spaced about and
4 extending generally radially out from said optic and having inner
ends joined to said optic and opposite outer ends movable
6 anteriorly and posteriorly relative to said optic, and wherein,

8 said optic has anterior and posterior surfaces, and

10 said posterior surface of said optic is convexly curved to a
substantially steeper convex curvature than said anterior surface
and provides at least most of the optical power of said optic.

32. An accommodating intraocular lens according to Claim
2 31, wherein:

4 said lens includes hinges at the inner ends of said extended
6 portions pivotally joining said extended portions to said optic
for anterior and posterior pivotal movement of said extended
6 portions at said hinges relative to said optic,

8 said hinges occupy posterior positions located rearwardly of said
10 plane when the inner ends of said extended portions are located
rearwardly of said plane, and said hinges occupy anterior
positions forwardly of said plane when the inner ends of said
extended portions are located forwardly of said plane, and

12 inwardly directed forces exerted on the outer ends of said
14 extended portions when said hinges are located rearwardly of said
16 plane urge said optic rearwardly, and inwardly directed forces
exerted on said extended portions urge said optic forwardly when
said hinges are located forwardly of said plane.

33. An accommodating intraocular lens according to Claim
2 32, wherein:

4 said hinges are located rearwardly of said plane when said lens
has said posterior distant vision configuration.

37. An accommodating intraocular lens according to Claim
2 36, wherein:

4 said extended portions have inner ends adjacent said optic,
6 opposite outer ends, and hinges at the inner ends of said extended
8 portions which accommodate pivotal movement of said extended
10 portions anteriorly and posteriorly relative to said optic at said
12 hinges.

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38. An accommodating intraocular lens to be surgically implanted within a natural ocular capsular bag including an elastic posterior capsule urged anteriorly by vitreous pressure and an anterior capsule opening bounded by an anterior capsule rim which fuses by fibrosis to the posterior capsule during a postoperative healing period following surgery with the ciliary muscle paralyzed in its relaxed state, said lens comprising:

8 a lens body having normally anterior and posterior sides, a central optic having a posterior surface, and a plurality of 10 extended portions extending generally radially out from the optic, each extended portion having an inner end connected to the optic, 12 and an outer end remote from said inner end movable anteriorly and posteriorly relative to said inner end,

14 said lens adapted for insertion through said anterior capsule opening to an implanted position within said bag in which said

16 extended portions are situated between said rim and posterior
capsule for fixation of the lens in the bag and posterior
18 deflection of the lens against said posterior capsule by fibrosis
of said rim to said posterior capsule during said healing period,
20 and said extended portions adapted for rearward deflection of said
optic under ciliary muscle relaxation to a posterior distant
22 vision position in which the lens has a posterior distant vision
configuration and for forward deflection of said optic under
24 ciliary muscle contraction to a near vision position, resulting in
consistent accommodation of the implanted lens under said
26 contraction and relaxation of the ciliary muscle, and wherein

said posterior surface of said optic is convexly curved to a
28 substantially steeper convex curvature than said anterior surface
and provides at least most of the optical power of said optic.

39. An accommodating intraocular lens according to Claim
2 38, wherein:

said extended portions have inner ends adjacent said optic,
4 opposite outer ends, and hinges at the inner ends of said extended
portions which accommodate anterior and posterior pivotal
6 movement of said extended portions at said hinges.

40. An accommodating intraocular lens for insertion
2 through an opening in an anterior capsule of a natural ocular
capsular bag for fixation adjacent to a posterior capsule of the
4 capsular bag, said lens comprising:

6 a central optic portion having an anterior surface and a posterior
surface,

8 a plurality of extended portions extending radially from the
central optic portion, each extended portion having an inner end
connected to the central optic portion and an outer end remote
from the inner end, each extended portion adapted to permit the
lens to fit within the opening formed in the anterior capsule and
10 to permit fixation of the intraocular lens, said extended portions
adapted to rearwardly deflect the central optic portion against
the posterior capsule under ciliary muscle relaxation, to
12 forwardly deflect the central optic portion under ciliary muscle
constriction, and to bias the central optic portion against the
posterior capsule during a substantial portion of its movement,
14 resulting in consistent accommodation of the implanted lens with
said constriction and relaxation of the ciliary muscle, and
16 wherein

each extended haptic portion comprises one of the following: (a)
22 a rotatably hinged extended portion, (b) a flexibly hinged
extended portion, (c) a bendable extended portion.

41. A method of providing accommodating vision to a
2 patient having a natural ocular capsular bag attached about its
perimeter to the ciliary muscle of the eye and including an
4 elastic posterior capsule urged anteriorly by vitreous pressure
and an anterior capsule opening bounded circumferentially by an
6 anterior capsule remnant which forms with said posterior capsule
an annular cul-de-sac within and about the perimeter of said bag
8 and which fuses by fibrosis to and is biased toward the posterior
capsule during a postoperative healing period with said ciliary
10 muscle paralyzed in its relaxed state, said method comprising the
steps of:

12 selecting an accommodating intraocular lens comprising a lens body
having normally anterior and posterior sides and including an
14 optic having an optic axis and extended portions spaced
circumferentially about and extending generally radially out from
16 said optic and having inner ends joined to edge portions of said
optic and opposite outer ends movable anteriorly and posteriorly
18 relative to said optic,

20 implanting said lens within said capsular bag in a position
wherein said optic is aligned with said anterior capsule opening
22 and said extended portions are situated within said cul-de-sac
between said anterior capsule remnant and said posterior capsule
with said ciliary muscle paralyzed in its relaxed state,

24 maintaining said ciliary muscle in its relaxed state during said
healing period to effect fixation of the lens within said bag by

26 fibrosis of said remnant to said posterior capsule and about said
extended portions and posterior deflection of said lens against
28 the posterior capsule by said remnant during fibrosis, and

said extended portions adapted for rearward deflection of said
30 optic to said posterior distant vision position under ciliary
muscle relaxation after said healing period and for forward
32 deflection of said optic to a near vision position under ciliary
muscle contraction after said healing period, resulting in
34 consistent accommodation of the implanted lens under said
contraction and relaxation of the ciliary muscle.

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42. The method of Claim 41, wherein:

42 said extended portions comprise one of the following: (a) hinged
extended portions whose inner ends are hinged to said optic for
4 pivotal movement of the extended portions relative to said optic,
(b) flexible extended portions which are bendable anteriorly and
6 posteriorly relative to said optic.

43. The method of Claim 41, wherein:

2 said optic and said extended portions have posterior surfaces
disposed in one of the following relationships relative to one
4 another: (a) a relationship such that only said posterior
surfaces of said extended portions contact said posterior capsule
6 in said posterior distant vision position, (b) a relationship such
that only said posterior surface of said optic contacts said
8 posterior capsule in said posterior distant vision position, (c) a
relationship such that said posterior surface of said optic and
10 said posterior surfaces of said extended portions contact said
posterior capsule in said posterior distant vision position.

44. An accommodating intraocular lens to be surgically
implanted within a natural ocular capsular bag including an
elastic posterior capsule urged anteriorly by vitreous pressure
4 and an anterior capsule opening bounded by an anterior capsule rim
which fuses by fibrosis to the posterior capsule during a post
6 operative healing period following surgery with the ciliary muscle
paralyzed in its relaxed state, said lens comprising:

8 a lens body having normally anterior and posterior sides and
including an optic having an optic axis, and extended portions
10 spaced apart about the optic,

each said extended portion including a haptic member extending

12 generally radially out from said optic and having an inner end
joined to an edge portion of the optic and an opposite outer end,
14 and a pair of resiliently flexible fixation fingers at the outer
end of each haptic member and having normal unstressed positions
16 in which the fingers extend laterally in opposite directions from
the respective haptic member transversely of said optic,

18 said fingers being resiliently flexible and bendable from their
normal unstressed configurations inwardly toward the optic to
20 deflected positions wherein the fingers conform approximately to a
common curvature, and

22 an enlarged protuberance at the outer end of at least one of said
fixation fingers and defining an opening therein for improved
24 fixation by fibrosis.

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45. An accommodating intraocular lens according to Claim
2 44, wherein:

4 said lens is adapted for insertion through said anterior capsule
6 opening to an implanted position within said bag in which said
extended portions are situated between said rim and posterior
capsule for fixation of the lens in the bag and posterior
deflection of the lens against said posterior capsule by fibrosis
8 of said rim to said posterior capsule during said healing period,
and said extended portions adapted for rearward deflection of said
10 optic under ciliary muscle relaxation to a posterior distant
vision position in which the lens has a posterior distant vision
12 configuration and for forward deflection of said optic under
ciliary muscle contraction to a near vision position, resulting in
14 consistent accommodation of the implanted lens under said
contraction and relaxation of the ciliary muscle.

46. An accommodating intraocular lens according to Claim
2 44, wherein the flexible fixation fingers extend laterally
edgewise from the outer end of the extended portions.

47. An accommodating intraocular lens according to Claim
2 44, wherein an enlarged protuberance defining an opening is
disposed at the outer end of each of said fixation fingers.

48. An accommodating intraocular lens according to Claim
2 44, and further including a recessed pocket defined in at least
one of said extended portions to receive a drug dispensed over a
4 period of time.

49. An accommodating intraocular lens according to Claim
2 48, wherein said drug is Atropine.

50. An accommodating intraocular lens to be surgically implanted within a natural ocular capsular bag including an elastic posterior capsule urged anteriorly by vitreous pressure and an anterior capsule opening bounded by an anterior capsule rim which fuses by fibrosis to the posterior capsule during a post operative healing period following surgery with the ciliary muscle paralyzed in its relaxed state, said lens comprising:

8 a lens having a generally central optic and normally anterior and posterior sides,

10 two pairs of haptic extending portions extending generally oppositely from the optic,

12 a loop extending outwardly between the haptic extending portions of each pair, said loop having a portion generally transversely of

14 the haptics, and

an arm extending from said generally transverse portion of the
16 loop and extending at an acute angle relative thereto, said arm
having a protuberance at its outer end, said protuberance defining
18 an opening,

22 said lens being adapted for insertion through said anterior
20 capsule opening to an implanted position within said bag in which
said extended portions are situated between said rim and posterior
capsule for fixation of the lens in the bag and posterior
deflection of the lens against said posterior capsule by fibrosis
24 of said rim to said posterior capsule during a healing period, and
26 said extended portions being adapted for rearward deflection of
said optic under ciliary muscle relaxation to a posterior distant
vision position in which the lens has a posterior distant vision
28 configuration and for forward deflection of said optic under
ciliary muscle contraction to a near vision position, resulting in
30 consistent accommodation of the implanted lens under said
contraction and relaxation of the ciliary muscle.

51. An accommodating intraocular lens according to Claim
2 50, wherein:

4 said loop has portions extending in generally parallel relation
outwardly from the optic.

52. An accommodating intraocular lens according to Claim
2 50, wherein:

8 said haptic extending portions are in spaced relation about the
optic and extend radially outwardly from the optic, and

said loops have radially extending portions extending radially
from said haptic extending portions and arcuate generally
transverse portions therebetween, and

8 said arms extend generally transversely at an acute angle to the
generally transverse portion of the loop, and

10 said loops have protuberances at their ends defining openings.